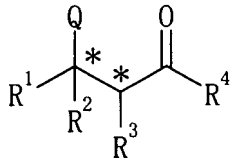
AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A process for producing an optically active ß-amino acid derivative of the formula (2):



(2)

wherein R^1 and R^2 are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted and a heterocyclic group which may be substituted;

R^3 is a hydrogen atom, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group and a hydrocarbon group which may be substituted;

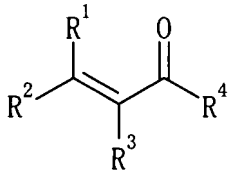
R^4 is an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group, $-NR^aR^b$ [wherein R^a and R^b are each independently a hydrogen atom, a hydrocarbon group which may be substituted and an acyl group which may be substituted, $-SO_2A^1$ (wherein A^1 is a hydrocarbon group which may be substituted or a substituted amino group), or $-COOR^c$ (R^c is a hydrocarbon group which may be substituted)] or a heterocyclic group which may be substituted, and R^1 and R^2, or R^2 and R^3 each may combine to form a ring; with the proviso that when $R^1 = R^2$, then R^3 is a hydrocarbon group which may be substituted;

Q is a group formed by removing a hydrogen atom from an amine; and

* indicates an asymmetric carbon atom;

or a salt thereof,

which comprises reacting an α,β-unsaturated carboxylic acid derivative of the formula (1):



(1)

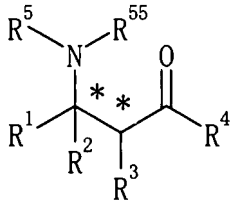
wherein R^1 to R^4 are each the same as mentioned above, with an amine or a salt thereof, in the presence of a chiral catalyst and in the presence of an acid.

2. (Original) The process according to claim 1, wherein said amine or acid salt thereof is a compound of the formula (3):

R^5-NH-R^{55}·aX (3)

wherein R^5 and R^{55} are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted or an aralkyloxy group which may be substituted; X is an acid; and a is 0 or 1.

3. (Original) The process according to claim 1, wherein said optically active ß-amino acid or salt thereof is a compound of the formula (4):



· bX (4)

wherein R^1 and R^2 are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which

may be substituted, an aralkyloxy group which may be substituted or a heterocyclic group which may be substituted;

R^3 is a hydrogen atom, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group or a hydrocarbon group which may be substituted;

R^4 is an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group, $-NR^aR^b$ [wherein R^a and R^b are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, $-SO_2A^1$ (wherein A^1 is a hydrocarbon group which may be substituted or a substituted amino group), or $-COOR^c$ (R^c is a hydrocarbon group which may be substituted)] or a heterocyclic group which may be substituted;

R^5 and R^{55} are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted or an aralkyloxy group which may be substituted;

b is 0 or 1;

X is an acid;

* indicates an asymmetric carbon; or

R^1 and R^2, or R^2 and R^3 may combine to form a ring, with the proviso that when $R^1 = R^2$, then R^3 is a hydrocarbon group which may be substituted.

4. (Original) The process according to claim 1, wherein the chiral catalyst is a chiral transition-metal complex of the formula (5):

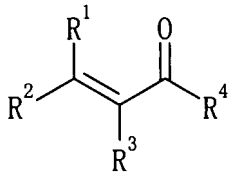
$$[M_2L_pA_q]^{y+}(Z^-)_y \quad (5)$$

wherein L is a chiral ligand; Z^- is a counter anion; A is an anionic ligand selected from the group consisting of a hydroxy group, an amide group, an alkoxy group and a halogen atom; M is a transition metal; y is 0 or 2; q is 2; p is 2 or 4, or of the formula (6):

$ML_rB_s(Z^-)_c$ (6)

wherein L is a chiral ligand; Z^- is a counter anion; B is a water molecule or a neutral ligand; M is a transition metal; r is 1 or 2; s is 0, 1, 2, 4 or 6; c is 0, 1 or 2.

5. (Previously Presented) The process according to claim 1, wherein the α,β-unsaturated carboxylic acid derivative of the formula (1):



(1)

wherein R^1 and R^2 are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, or a heterocyclic group which may be substituted;

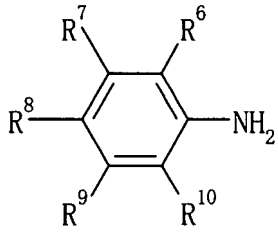
R^3 is a hydrogen atom, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group, or a hydrocarbon group which may be substituted;

R^4 is an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group, $-NR^aR^b$ [wherein R^a and R^b are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, $-SO_2A^1$ (wherein A^1 is a hydrocarbon group which may be substituted or a substituted amino group), or $-COOR^c$ (R^c is a hydrocarbon group which may be substituted)], or a heterocyclic group which may be substituted; or

R^1 and R^2, or R^2 and R^3 may combine to form a ring, with the proviso that when $R^1 = R^2$,

then R^3 is a hydrocarbon group which may be substituted,

is reacted with a primary amine of the formula (3b):

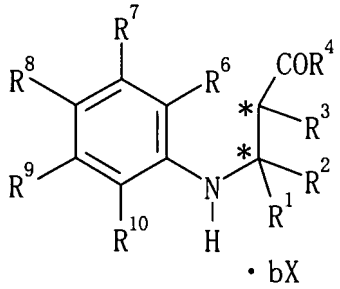


$$\cdot aX \qquad (3b)$$

wherein a is 0 or 1; R^6 to R^{10} are each independently a hydrogen atom, a hydrocarbon group which may be substituted, a halogen atom, a heterocyclic group which may be substituted, an alkoxy group which may be substituted, an aralkyloxy group which may be substituted, an aryloxy group which may be substituted, an acyl group which may be substituted, an acyloxy group, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkylenedioxy group, a hydroxy group, a nitro group or an amino group which may be substituted; or

R^6 and R^7, R^7 and R^8, R^8 and R^9, or R^9 and R^{10} each may combine to form a fused ring, with the proviso that at least one of R^6 to R^{10} is a halogenated hydrocarbon group; and

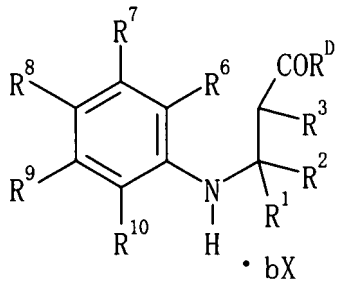
X is an acid, or a salt thereof in the presence of an acid and in the presence of a chiral catalyst, to produce an optically active ß-amino acid derivative of the formula (4a):



$$\cdot bX \qquad (4a)$$

wherein b is 0 or 1; * indicates an asymmetric carbon; and R^1 to R^{10}, a and X are each the same as defined above.

6. (Currently amended) A compound of the formula (4b):



(4b)

wherein R^1 ~~and R^2 are each independently a hydrogen atom,~~ is a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted or a heterocyclic group which may be substituted;

R^2 is a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted or a heterocyclic group which may be substituted;

R^3 is a hydrogen atom, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group or a hydrocarbon group which may be substituted; or

R^1 and R^2, or R^2 and R^3 each may combine to form a ring;

R^6 to R^{10} are each independently a hydrogen atom, a hydrocarbon group which may be substituted, a halogen atom, a heterocyclic group which may be substituted, an alkoxy group which may be substituted, an aralkyloxy group which may be substituted, an aryloxy group which may be substituted, an acyl group which may be substituted, an acyloxy group, an alkoxycarbonyl

group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkylenedioxy group, a hydroxy group, a nitro group or an amino group which may be substituted; or

R^6 and R^7, R^7 and R^8, R^8 and R^9, or R^9 and R^{10} each may combine to form a fused ring, with the proviso that at least one of R^6 to R^{10} is a halogenated hydrocarbon group;

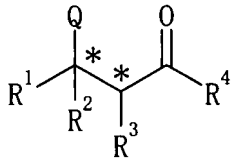
X is an acid;

b is 0 or 1; and

R^D is a heterocyclic group which may be substituted.

7. (Previously Presented) The process according to claim 4, wherein the chiral transition-metal complex of the formula (5) or (6) is selected from the group consisting of Pd((*R*)-binap)$(H_2O)_2(OTf)_2$, Pd((*S*)-dm-binap)$(H_2O)_2(OTf)_2$, Pd((*R*)-segphos)$(H_2O)_2(OTf)_2$ and Pd((*R*)-binap)$(\mu\text{-}OH)_2(OTf)_2$.

8. (New) A process for producing an optically active ß-amino acid derivative of the formula (2):



(2)

wherein R^1 and R^2 are each independently a hydrogen atom, a hydrocarbon group which may be substituted, an acyl group which may be substituted, an alkoxycarbonyl group which may be substituted, an aryloxycarbonyl group which may be substituted, an aralkyloxycarbonyl group which may be substituted, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted and a heterocyclic group which may be substituted;

R^3 is a hydrogen atom, an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group and a hydrocarbon group which may be substituted;

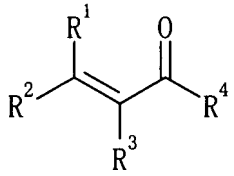
R^4 is an alkoxy group which may be substituted, an aryloxy group which may be substituted, an aralkyloxy group which may be substituted, a hydroxy group, $-NR^aR^b$ [wherein R^a and R^b are each independently a hydrogen atom, a hydrocarbon group which may be substituted and an acyl group which may be substituted, $-SO_2A^1$ (wherein A^1 is a hydrocarbon group which may be substituted or a substituted amino group), or $-COOR^c$ (R^c is a hydrocarbon group which may be substituted)] or a heterocyclic group which may be substituted, and R^1 and R^2, or R^2 and R^3 each may combine to form a ring; with the proviso that when $R^1 = R^2$, then R^3 is a hydrocarbon group which may be substituted;

Q is a group formed by removing a hydrogen atom from an amine; and

* indicates an asymmetric carbon atom;

or a salt thereof,

which comprises reacting an α,β-unsaturated carboxylic acid derivative of the formula (1):



(1)

wherein R^1 to R^4 are each the same as mentioned above, with an amine or a salt thereof, in the presence of a chiral catalyst,

wherein the chiral catalyst is a chiral transition-metal complex of the formula (5):

$$[M_2L_pA_q]^{y+}(Z^-)_y \quad (5)$$

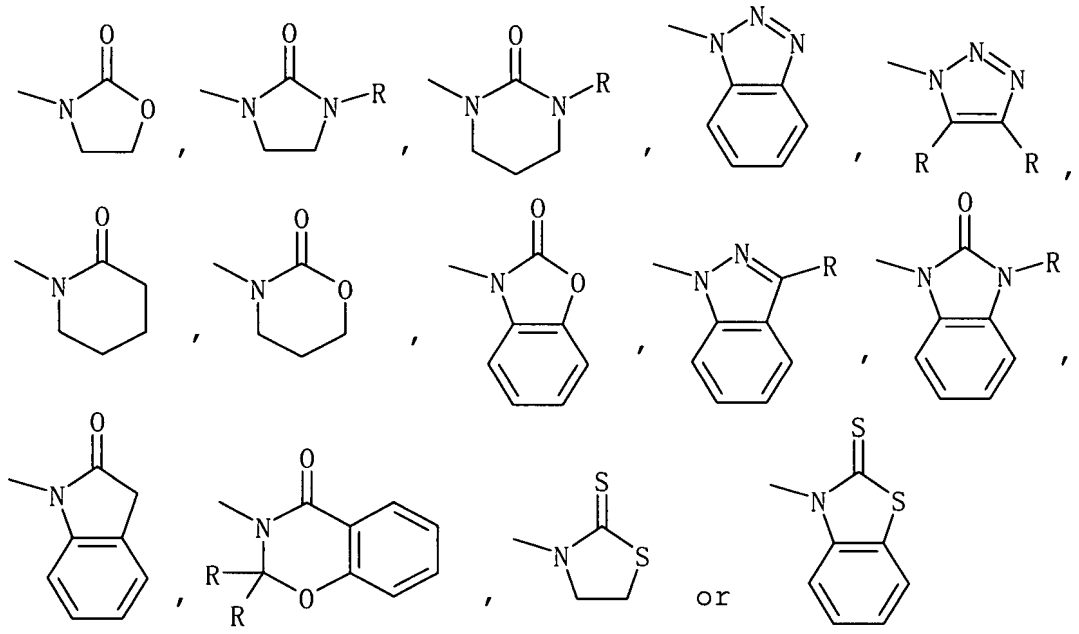
wherein L is a chiral ligand; Z^- is a counter anion; A is an anionic ligand selected from the group consisting of a hydroxy group, an amide group, an alkoxy group and a halogen atom; M is a transition metal; y is 0 or 2; q is 2; p is 2 or 4, or of the formula (6):

$ML_rB_s(Z^-)_c$ (6)

wherein L is a chiral ligand; Z^- is a counter anion; B is a water molecule or a neutral ligand; M is a transition metal; r is 1 or 2; s is 0, 1, 2, 4 or 6; c is 0, 1 or 2,

and in the presence of an acid.

9. (New) The compound according to claim 6, wherein R^D is



wherein R is, the same or different, a hydrogen atom or a hydrocarbon group which may be substituted.